AAR-100

Human Factors Newsletter # 01-16

(August 4, 2001 – August 17, 2001)

Program Planning: Representatives from the Human Factors Division (AAR-100) and the Civil Aerospace Medical Institute (CAMI/AAM-510) traveled to the William J. Hughes Technical Center to meet with researchers from the NAS Human Factors Branch to discuss collaborative research proposals for FY2002 and beyond. Candidate human factors research included electronic flight strips in the terminal environment. (P. Della Rocco, WJHTC/ACT-530)

Data Link: William J. Hughes Technical Center preparations for a data link study, sponsored by the En Route IPT (AUA-200), are continuing. This study will investigate the need for a logical acknowledgement to the controller of the aircraft's receipt of a data link message. Development of the project includes enhancing the DSR simulation software to emulate the Air Traffic DSR Evolution Team Controller Pilot Data Link Communication 1/A interface. (R. Sollenberger, WJHTC/ACT-530)

DARC: Research psychologists from the William J. Hughes Technical Center met with personnel from AOS-320 to discuss human factors participation during development of a support console for the Direct Access Radar Channel (DARC). The support console will provide Airway Facilities personnel with monitor and control capability for the DARC through a graphical user interface. (T. Yuditsky, D. M. McAnulty, FAATC/ACT-530)

ADS-B: A representative from the William J. Hughes Technical Center participated in meetings at the University of Alaska to develop methods for evaluating the usability of Cockpit Displays of Traffic Information (CDTI) based on Automatic Dependent Surveillance - Broadcast (ADS-B) in the Bethel region of Alaska. The group discussed air traffic control issues in the use of ADS-B, and collected information about using ADS-B and multilaterion technology in the Juneau area. The group also interviewed Part 135 operators and pilots in Bethel and met with the airport manager, air traffic control tower manager, flight service station manager, and a helicopter operator and pilot in Juneau. Included was a meeting with personnel at Anchorage Center. (M. McAnulty, WJHTC/ACT-530)

ETMS: Human factors researchers at the William J. Hughes Technical Center briefed representatives from AUA-700, ATT-220, and VOLPE NTSC on human factors work completed in support of the Enhanced Traffic Management System (ETMS). The briefing described the procedures and results of activities, including a Usability Assessment that was conducted at the Technical Center in June 2001. The ETMS program will continue to work with the Human

Factors Branch on improvements to the system's computer-human interface. (T. Yuditsky, WJHTC/ACT-530)

AGATE: Dr. Dennis Beringer/CAMI traveled to Oshkosh, WI, July 30 and 31 to participate in the AGATE close-out meetings at the EAA Museum. Status reports were presented and dates were set for the receipt of final documentation. CAMI will provide reports on usability of the Jeppesen navigation software and input devices. Bruce Holmes/CAMI presented a briefing on the Small Airplane Transportation System (SATS) program, which is to be the follow-on to the AGATE program. (D. Beringer, CAMI)

SAE G-10 Meeting: CAMI representatives participated in the SAE G-10 Subcommittee on Human Factors meeting in San Diego, CA, on August 1-3. Dr. Dennis Beringer assumed responsibility for writing assignments for the Ground Operations Committee. One new subcommittee will develop an Aerospace Recommended Practice (ARP) and an Aerospace Research Document (ARD) on 3-D perspective flight displays. Formation of the subcommittee was approved and an initial planning meeting was held. Those interested in participating in the subcommittee should contact Dr. Kevin Williams/CAMI.. (D. Beringer/CAMI; K. Williams, CAMI)

Human-Computer Interaction: Dr. Dennis Beringer/CAMI chaired a session (as organizer) on applications of real-time simulation at the 2001 Human-Computer Interaction International Meeting in New Orleans, LA. He also presented a paper entitled "An Example of General Aviation Simulation Research for Developing Certification Criteria and Guidelines: Primary Flight Displays". (D. Beringer, CAMI)

Capstone Program: A CAMI scientist went to Anchorage, Bethel, and Juneau, Alaska to participate in an orientation and planning meeting of the Safe Flight 21, General Aviation Safety, Human Factors Team. Discussed were the current status of the Alaska Capstone, Phase I, Program being performed in the Bethel, Alaska area, and the upcoming Phase II, being performed in the Juneau, Alaska area. Plans for supporting both phases of the program were created and are currently in progress. (K. Williams, CAMI)

JANUS: In July, representatives from CAMI (AAM-510) and AAT-200 met with management and bargaining unit personnel from DFW, D10, and ZFW to present a detailed briefing on how the JANUS human-in-the-system technique could be used to collect data related to operational errors. The briefing presented an overview of the JANUS technique, samples of specific items, and the scientific methodology required for effective field data collection. In addition, and as part of a project sponsored by the Runway Safety Office (ATS-20), the representatives met with members of the Western Pacific Regional Management Team at the FAA Western Pacific Region Headquarters. The team was briefed on use of the JANUS technique for identification of causal factors in runway incursions. The technique, based on a human factors approach, permits a 360-degree diagnosis of the event. Also included in the itinerary was a meeting with representatives of the Southwest Region's Runway Safety Program at the FAA Southwest Region Headquarters. The meeting was organized by ASW-505, and participants discussed use of the JANUS technique to identify causal factors in runway incursions. (J. Pounds, CAMI)

Awards: Congratulations to Mr. Glen Hewitt and Dr. Chuck Overbey on receiving awards at the Annual ARA Awards Ceremony held in Washington, DC on August 16th . Glen Hewitt received the Associate Administrator's (Research and Acquisitions) Award for Excellence. He was recognized for his work in developing, coordinating, and managing acquisition engineering activities in support of ARA Performance Goal 2. The award also recognized Glen for community service through his work with the Christ Church Children of Chernobyl ministry. Special mention was made of his contributions to the Children of Chernobyl program since he and his family first became involved in 1995, and his role as treasurer and then chairman of the committee. Glen also received a NAS Modernization Award for his work on the System Safety Working Group. Dr. Overbey received a Mission Excellence Award for his work on the Airport Surface Movement Enhancement and Runway Incursion Reduction Program Investment Analysis Team. (B. Berger, AAR-100)

Human Factors Associated with the Certification of Airplane Seat and Restraint Systems: The CAMI Biodynamics Research team conducted three unique studies to address human factors questions that relate to the biodynamic testing and certification of transport passenger seats. The trials were conducted in conjunction with the 2544 subject Access-to-Egress emergency exit tests that were conducted at CAMI this past spring. The three issues addressed in these studies focused on human factors associated with occupant safety requirements in FAA regulations and policies for seat and restraint systems. Human performance tests, using the same pool of subjects for the Access-to Egress study, were conducted under three protocols to measure and assess: (1) seat belt tension adjustment during normal flight and emergency landing conditions; (2) the effects on passenger emergency egress performance related to the lift-latch release angle of typical lap belts; and (3) under-seat life vest installation factors that affect the capability and ease for a passenger to retrieve the vest.

In the lap belt tension adjustment study, subjects were asked to sit in a typical passenger seat and adjust the lap belts as they normally would for take-off or landing during a commercial flight. Participants were then asked to adjust the tightness of the lap belts as if told to prepare for an emergency landing. The airplane seat used in this study was instrumented to measure the tension in the lap belts, and the belt tensions for both normal and emergency conditions were recorded. Approximately 1750 subjects participated in this study. An initial analysis of results from this study indicate that the typical passenger tightens the lap belts to a tension in the ranges of 5-8 lbs. for an anticipated emergency and 2-5 lbs. during normal flight conditions. This data is important to those conducting dynamic impact tests for seat certification (14 CFR 25.562).

The lift-latch release angle experiments were designed to study lap-belt-restrained human subjects as they released the belt buckle and proceeded to egress from a typical passenger seat. Some foreign regulatory authorities require the release angle to be >90°; whereas, FAA regulations specify the release angle to be < 60°. Three lap belts with latch release angles of 30°, 60°, and 90° were installed on a triple passenger seat. Each subject was observed and timed as they tried to release the belts and exit from the seat. Each was instructed to perform the exercise quickly. Comments on preference or difficulty were also elicited from the subjects. A total of 207 subjects participated in this test protocol. No significant differences in human performance factors related to the lift-latch angle have been determined from an early analysis of the results.

Under-seat life vest retrieval in the confines of a narrow seat-pitch economy class cabin was studied in the third research project. FAA policies dictate that for aircraft with personal floatation devices installed beneath the seat, the device (life vest) must be easily retrievable. Compliance with this requirement is subjective on the part of the certifying authority, and has been notably inconsistent in recent years. This CAMI research was designed to analyze human performance factors such as time for vest retrieval, physical interference with the cabin environment, and physical capability to reach the vest while seated/belted. Four different life vest installation methods were included in this protocol, and 137 human subject tests were conducted. The early analysis of the data indicates there are physical installation features that significantly affect the ease and-or capability for a typical passenger to retrieve the under-seat life vest.

Life Vest Retrieval Setup

The results from all three of these studies are currently being compiled and analyzed for publication this year. Information from these efforts will be provided to FAA regulatory offices responsible for the implementation and enforcement of cabin safety regulations. The programs have also been coordinated with the SAE Aircraft Seat Committee, which includes international representatives from manufacturers, airlines, and regulatory authorities. For further information, contact Van Gowdy at CAMI at 405-954 –5510. (J. Whinnery, CAMI)

Line Operations Safety Audit (LOSA): The July 16, 2001 issue of *Aviation Week & Space Technology* contains several cover story articles on human factors in air carrier training. One of the articles describes LOSA research currently underway at the University of Texas under a research grant provided by the FAA. According to the article, "LOSA is an evaluation technique that monitors how well pilots respond to in-flight threats like severe weather or congested

airports. LOSA is proving to be an effective tool to capture candid information about what happens behind the cockpit door, not with video cameras, but with non-intrusive observers who ride in jump seats, watching an airline's pilots work and interviewing them during and after hundreds of flights. At the University of Texas, researchers incorporate the observer's reports and crew questionnaires into a proprietary database. Then they set about doing what researchers do best – pulling trends, good and bad, from the anonymous sessions and giving the information back to the airline in a form that can help the carrier make changes to training and safety programs." Data is now available from 13 airlines, so "carriers also get to see how they stack up against national and international competitors". Other articles address new technologies in the cockpit, full flight simulators, PC-based tools, and pilot fatigue. (E. Edens, AFS-230)

More information on human factors research can be found at the FAA Human Factors (AAR-100) web site: http://www.hf.faa.gov

Mark D. Rodgers
FAA (AAR-100)

CALENDAR

August 27-31, 2001 – FAA Academy International Aviation Training Symposium, Myriad Center, Oklahoma City, OK http://www.iats.com/

September 4-6, 2001 – MRO Europe 2001, Scottish Exhibition & Conference Centre, Glasgow, Scotland http://www.aviationnow.com/conferences

September 10-14, 2001 – Aerospace Congress & Exhibition by Aerospace North America and SAE, Washington State Convention and Trade Center, Seattle, WA mail to:kthomson@sae.org

September 16-20, 2001 – 49th International Congress of Aviation and Space Medicine, Geneva, Switzerland http://icasm2001.org/

September 17-19, 2001 – SAFE Association Symposium on Safety, Survival and Flight Equipment, Opryland Hotel, Nashville, TN http://www.safeassociation.com/

September 18-20, 2001 – NBAA Annual Meeting and Convention, New Orleans, LA http://www.nbaa.org/

September 25-26, 2001 – 18th Annual ALPA Communications for Safety Conference, Doubletree Hotel, Denver, CO http://safety.natca.net/

September 26-28, 2001 – Human Issues in Aviation Systems Symposium, Toulouse, France mailto:wise@db.erau.edu

October 8-12, 2001 – Human Factors and Ergonomics Society 45th Annual Meeting, Human Factors/Ergonomics: It Works, Minneapolis, MN http://www.hfes.org/

October 14-18, 2001 – Aerospace Expo 2001, Los Angeles Convention Center, Los Angeles, CA http//www.aviationnow.com/conferences

October 22-25, 2001- Annual Cabin Safety Research Technical Group Meeting, Taj Mahal Hotel and Casino, Atlantic City, NJ

October 22-25, 2001 - DOD Technical Advisory Group Meeting, San Diego, CA http://dticam.dtic.mil/hftag/

October 30-31, 2001 – FAA Research, Engineering and Development Advisory Committee (REDAC) meeting, Washington, DC mailto:tom.proeschel@faa.gov

October 31-November 2, 2001 – Air Cargo Americas 2001, Sixth International Congress and Exhibition, Radisson Center, Miami, FL http://www.worldtrade.org/

November 4-8, 2001 – ATCA 46th Annual International Program & Exhibits, Washington Convention Center, Wash, D.C. http://atca.org/

November 5-8, 2001 – Joint meeting of the Flight Safety Foundation 54th International Air Safety Seminar, the International Federation of Airworthiness 31st Conference, and International Air Transport Association. Theme: Keeping People Safe in a Global Environment. Athens, Greece http://www.flightsafety.org/

November 8-10, 2001 – AOPA Expo 2001, Fort Lauderdale, FL http://aopa.org/expo

November 27-30, 2001 - The Third International Aviation Security Technology Symposium, Tropicana Resort & Casino, Atlantic City, NJ, sponsored by the FAA Aviation Security R&D Division and National Safe Skies Alliance. Symposium topics include: Trace Detection, Bulk Detection, Human Factors, Technical Integration, Operational Testing and Evaluation, Deployment, Aircraft Hardening, Emerging Technologies, and other related topics. http://www.safeskiesinternational.org/symposium_2001.htm

December 3-5, 2001 – MRO Asia 2001, Regal Hotel, Hong Kong http://www.aviationnow.com/conferences

December 3-7, 2001 – FAA/EUROCONTROL Air Traffic Management R&D Seminar, Santa Fe, New Mexico http://atm2001.eurocontrol.fr

December 10-11, 2001 – FAA/EUROCONTROL R&D Committee Meeting, Santa Fe, New Mexico http://atm2001.eurocontrol.fr

February 26-March 3, 2002 – Air Freight Expo 2002, Shangri-La Hotel, Singapore http://www.eyefortransport.com/asia2001

May 5-9, 2002 – 73rd Annual Scientific Meeting of the Aerospace Medical Association, Queen Elizabeth's Hotel, Montreal, Canada http://www.asma.org/

September 23-27, 2002 – Human Factors and Ergonomics Society 46th Annual Meeting, Pittsburgh, PA http://www.hfes.org/

April 7-27, 2003 – Aviation World's Fair, Newport News/Williamsburg, VA
http://www.worlds-fair.com/

May 4-9, 2003 – 74th Annual Scientific Meeting of the Aerospace Medical Association, Convention Center, San Antonio, TX http://www.asma.org/

May 2-7, 2004 – 75th Annual Scientific Meeting of the Aerospace Medical Association, Egan Convention Center, Anchorage, AK http://www.asma.org/

Note: Calendar events in Italics are new since the last Newsletter

Comments or questions regarding this newsletter?
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